

Integrated regional prospectivity screening of a mature petroleum province in the eastern flank of the south Oman Salt Basin

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ABSTRACT

The Eastern Flank of the South Oman Salt Basin (SOSB) is a mature oil province that yields significant resources in reservoirs from the Neo-Proterozoic to the Cenozoic. However, limited seismic resolution largely affected by multiples originated from shallow carbonate units has hampered the comprehensive understanding of the overall petroleum system evolution and importantly, the ability to increase a portfolio of exploration opportunities in this proven province.

Using a recent de-multiple reprocessing tool applied both to legacy and new seismic surveys covering about 8500 km², the remaining hydrocarbon potential of the Eastern Flank of the SOSB was assessed by means of an integrated bottom to top 3D based regional geological assessment. Together with extensive seismic interpretation, indirect seismic extraction tools, revised depth-conversion and updated charge models derived and tied to an extensive database (including over 5900 wells and field data), the comprehensive exploration screening allowed to delineate new plays and prospects to feed into the drilling sequence.

The final regional 3D geological depth model provided structural and stratigraphic control for prospectivity screening throughout the evaluated 12 target plays, which included pre and post-salt units bounded by 6 regional unconformities, all affected by noteworthy velocity variations across the model. This approach allowed the update of the exploration portfolio by elaborating regional play-based evaluation recipes and consistent application of risk criteria. Post study drilling results of two exploration wells and one near-field exploration well have intersected oil in predicted target plays and have so far validated the generated geological model and prospectivity assessment.